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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,643	12/20/2001	Kie Y. Ahn	1303.030US1	2660

21186 7590 12/04/2002

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EXAMINER
PHAM, LONG

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/028,643	Applicant(s) AHN ET AL.	
	Examiner Long Pham	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) *14-54* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-12 and 55 in Paper No. 6 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 3, 5, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this application (AAPA) in view of Yano et al. (US '080) and Japan 2001332546A (JP '546A).

AAPA teaches a method of forming a gate oxide on a transistor body region, comprising (see figures 1 and 2a-2c and the Background of the Invention of this application):

depositing a metal alloy layer by sputtering on the body region; and

oxidizing the metal alloy layer to form a metal oxide layer on the body region.

AAPA teaches that the metal alloy layer is formed by sputtering but fails to teach that the metal alloy layer is formed by thermal evaporation or electron beam evaporation as recited in present claims 1 and 3.

Yano et al teach a method in which metal alloy is deposited by electron beam evaporation and subsequently oxidized with oxygen gas to form an oxide. See col. 31, line 30 to col. 32, line 45.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to form the oxide layer as by taught by Yano et al. in the method of AAPA because in doing so an oxide layer having improved crystallinity and surface properties is obtained. See col. 7, lines 18-24.

AAPA and Yano et al. fail to teach that the metal alloy of cobalt and titanium is used to form the metal oxide as recited in present claim 2.

However, the use of metal alloy of cobalt and titanium in forming metal oxide is well-known to one of ordinary skill in the art of making semiconductor devices.

Yano et al. fail to teach the range for the deposition temperature as recited in present claim 5.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal range for the deposition temperature through routine experimentation and optimization to obtain optimal or desired device performance because the deposition temperature is a result-effective variable and there is no evidence indicating that the deposition temperature is critical or produces any unexpected results and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

Yano et al. fail to teach the range for the oxidation temperature as recited in present claim 6.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal range for the oxidation temperature through routine experimentation and optimization to obtain optimal or desired device performance because the oxidation temperature is a result-effective variable and there is no evidence indicating that the oxidation

temperature is critical or produces any unexpected results and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

AAPA and Yano et al. fail to teach that the oxidation is done by in presence of krypton and oxygen as recited in present claim 8.

JP '546A teaches that oxidation is done in the presence of krypton and oxygen. See the English abstract.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to perform the oxidation in presence of krypton and oxygen because in doing so high quality oxide is obtained. See the English abstract.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this application (AAPA) in view of Yano et al. (US '080) and Japan 2001332546A (JP '546A) as applied to claims 1, 2, 3, 5, 6, and 7 above, and further in view of the following remarks.

AAPA and Yano et al. do not appear to teach the using a single metal target in electron beam evaporation process. However, the use of single metal or multiple metal target is an obvious design choice.

5. Claims 9, 10, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this application (AAPA) in view of Yano et al. (US '080).

AAPA teaches a method of forming a gate oxide on a transistor body region, comprising (see figures 1 and 2a-2c and the Background of the Invention of this application):

depositing a metal alloy layer by sputtering on the body region; and

oxidizing the metal alloy layer to form a metal oxide layer on the body region. AAPA teaches that the metal alloy layer is formed by sputtering but fails to teach that the metal alloy layer is formed by thermal evaporation or electron beam evaporation as recited in present claims 9 and 11.

Yano et al teach a method in which metal alloy is deposited by electron beam evaporation and subsequently oxidized with oxygen gas to form an oxide. See col. 31, line 30 to col. 32, line 45.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to form the oxide layer as by taught by Yano et al. in the method of AAPA because in doing so an oxide layer having improved crystallinity and surface properties is obtained. See col. 7, lines 18-24.

AAPA and Yano et al. fail to teach that the metal alloy of cobalt and titanium is used to form the metal oxide as recited in present claim 10.

However, the use of metal alloy of cobalt and titanium in forming metal oxide is well-known to one of ordinary skill in the art of making semiconductor devices.

Yano et al. fail to teach the range for the deposition temperature as recited in present claim 13.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal range for the deposition temperature through routine experimentation and optimization to obtain optimal or desired device performance because the deposition temperature is a result-effective variable and there is no evidence indicating that the deposition temperature is critical or produces any unexpected results and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

AAPA and Yano et al. fail to teach that the oxidation is done by in presence of krypton and oxygen as recited in present claim 8.

JP '546A teaches that oxidation is done in the presence of krypton and oxygen. See the English abstract.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to perform the oxidation in presence of krypton and oxygen because in doing so high quality oxide is obtained. See the English abstract.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this application (AAPA) in view of Yano et al. (US '080) and Japan 2001332546A (JP '546A) as applied to claims 9, 10, 11, and 13 above, and further in view of the following remarks.

AAPA and Yano et al. do not appear to teach the using a single metal target in electron beam evaporation process. However, the use of single metal or multiple metal target is an obvious design choice.

7. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this application (AAPA) in view of Yano et al. (US '080).

AAPA teaches a method of forming a gate oxide on a transistor body region, comprising (see figures 1 and 2a-2c and the Background of the Invention of this application):

depositing a metal alloy layer by sputtering on the body region; and

oxidizing the metal alloy layer to form a metal oxide layer on the body region.

AAPA teaches that the metal alloy layer is formed by sputtering but fails to teach that the metal alloy layer is formed by thermal evaporation or electron beam evaporation as recited in present claim 55.

Yano et al teach a method in which metal alloy is deposited by electron beam evaporation and subsequently oxidized with oxygen gas to form an oxide. See col. 31, line 30 to col. 32, line 45.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to form the oxide layer as by taught by Yano et al. in the method of AAPA because in doing so an oxide layer having improved crystallinity and surface properties is obtained. See col. 7, lines 18-24.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 703-308-1092. The examiner can normally be reached on M-F, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-4082 for regular communications and 703-746-4082 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Long Pham
Primary Examiner
Art Unit 2814

L. P.
December 1, 2002